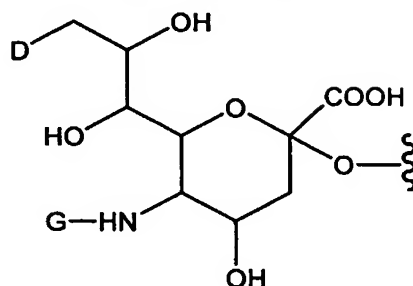


WHAT IS CLAIMED IS:

- 1 1. An erythropoietin peptide comprising the moiety:



2

3

wherein

4

D is a member selected from -OH and R^1 -L-HN-;

5

G is a member selected from R^1 -L- and $-C(O)(C_1-C_6)alkyl$;

6

R^1 is a moiety comprising a member selected a moiety comprising a straight-chain or branched poly(ethylene glycol) residue; and

7

8

L is a linker which is a member selected from a bond, substituted or

9

unsubstituted alkyl and substituted or unsubstituted heteroalkyl,

10

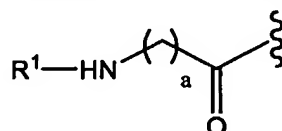
such that when D is OH, G is R^1 -L-, and when G is $-C(O)(C_1-C_6)alkyl$, D is

11

 R^1 -L-NH-.

1

2. The peptide according to claim 1, wherein L- R^1 has the formula:



2

3

wherein

4

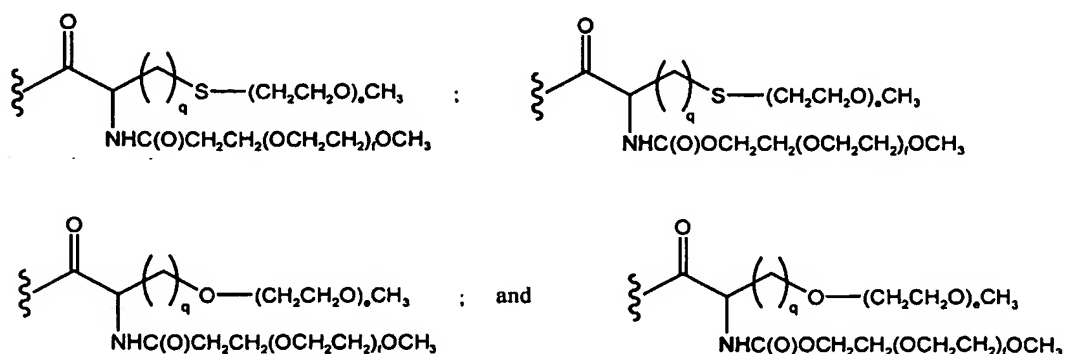
a is an integer from 0 to 20.

1

3. The peptide according to claim 1, wherein R^1 has a structure that is a member

2

selected from:

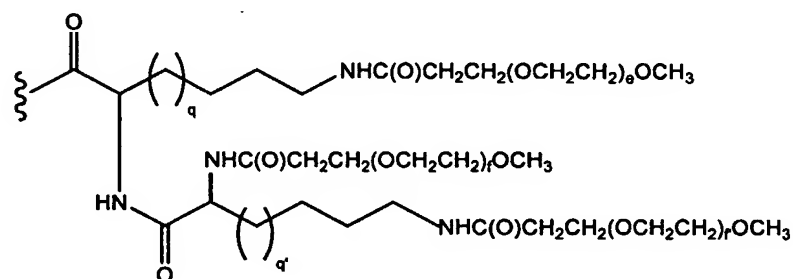
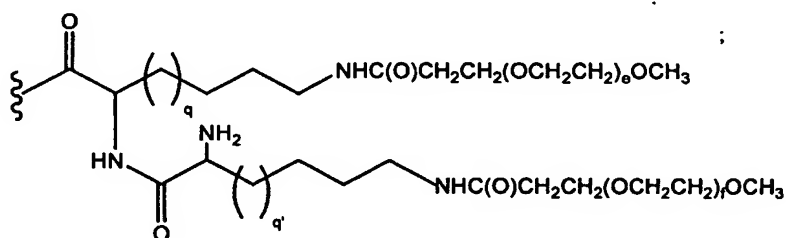
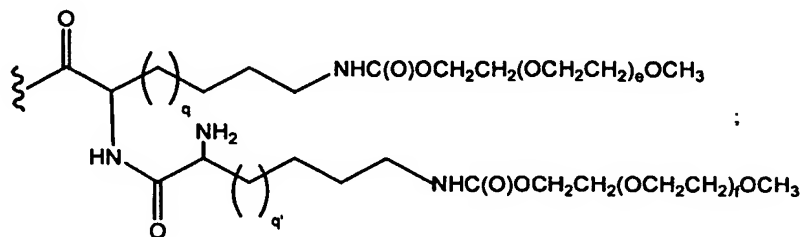


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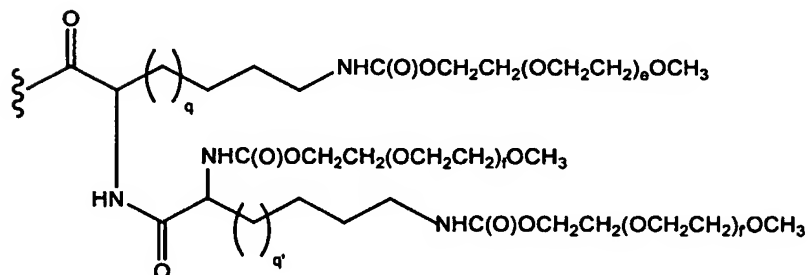
4

wherein

- 5 e and f are integers independently selected from 1 to 2500; and
 6 q is an integer from 0 to 20.
 1 4. The peptide according to claim 1, wherein R¹ has a structure that is a member
 2 selected from:



; and



3

4

wherein

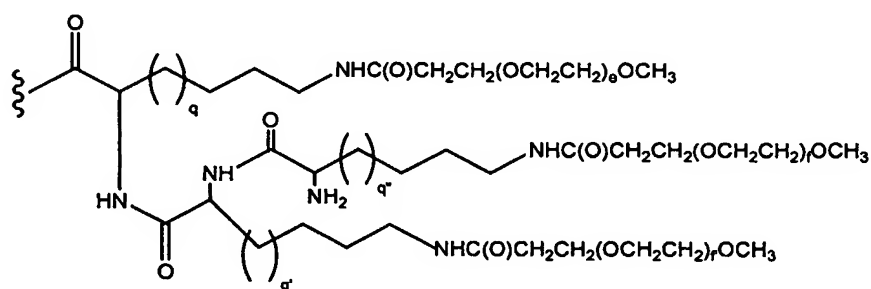
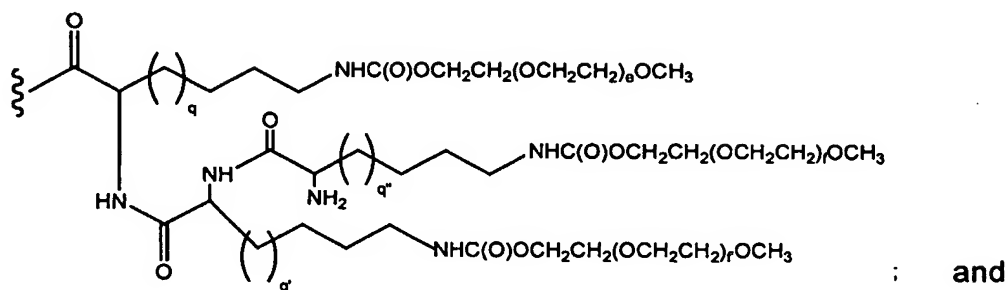
5

e, f and f' are integers independently selected from 1 to 2500; and

6

q and q' are integers independently selected from 1 to 20.

- 1 5. The peptide according to claim 1, wherein R¹ has a structure that is a member
2 selected from:



3

4

wherein

5

e, f and f' are integers independently selected from 1 to 2500; and

6

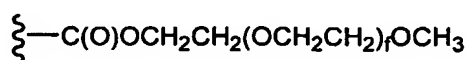
q, q' and q'' are integers independently selected from 1 to 20.

1

6. The peptide according to claim 1 wherein R¹ has a structure that is a member

2

selected from:



3

4

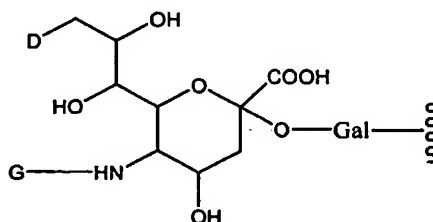
wherein

5

e and f are integers independently selected from 1 to 2500.

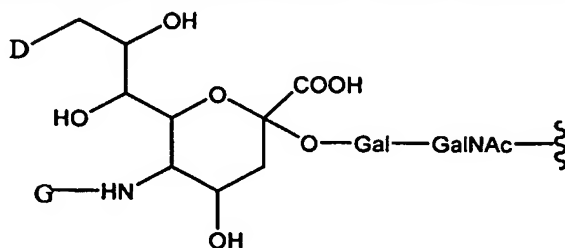
1

7. The peptide according to claim 1, wherein said moiety has the formula:

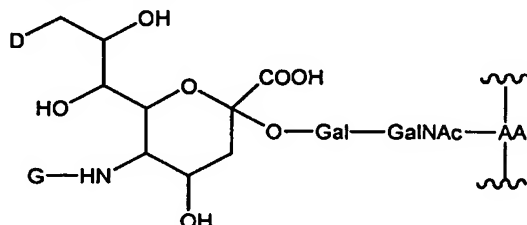


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1 8. The peptide according to claim 1, wherein said moiety has the formula:



1 9. The peptide according to claim 1, wherein said moiety has the formula:



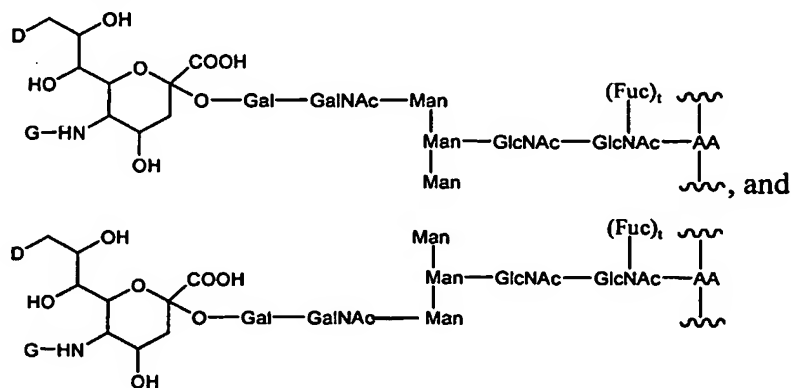
wherein AA is an amino acid residue of said peptide.

1 **10.** The peptide according to claim 9, wherein said amino acid residue is a
2 member selected from serine or threonine.

1 11. The peptide according to claim 10, wherein said peptide has the amino acid
2 sequence of SEQ. ID. NO:1.

1 **12.** The peptide according to claim 11, wherein said amino acid residue is a serine
2 at position 126 of SEQ. ID. NO:1.

1 **13.** The peptide according to claim 1, wherein said peptide comprises at least one
2 of said moiety according to a formula selected from:

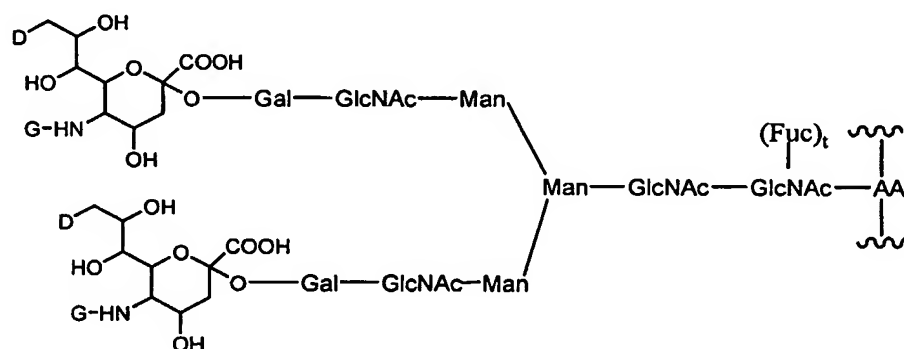


5 wherein AA is an amino acid residue of said peptide and t is an integer equal to 0
6 or 1.

1 14. The peptide according to claim 13, wherein said amino acid residue is an
2 asparagine residue.

1 **15.** The peptide according to claim 14, wherein said peptide has the amino acid
2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine
3 residue which is a member selected from N24, N38, N83, and combinations thereof.

1 **16.** The peptide according to claim 1 wherein said peptide comprises at least one
2 of said moiety according to the formula:

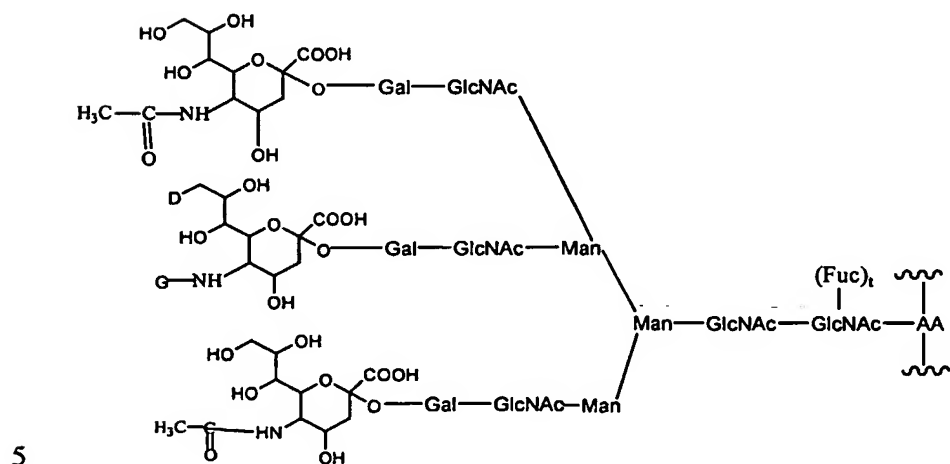
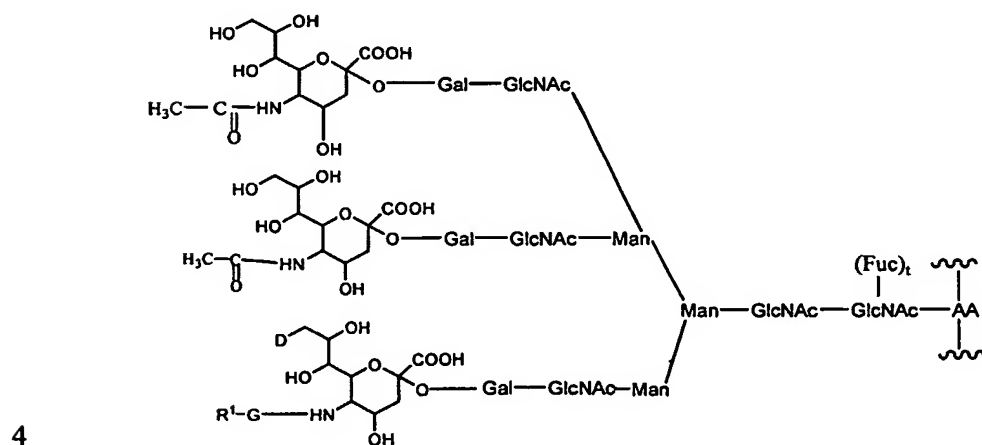
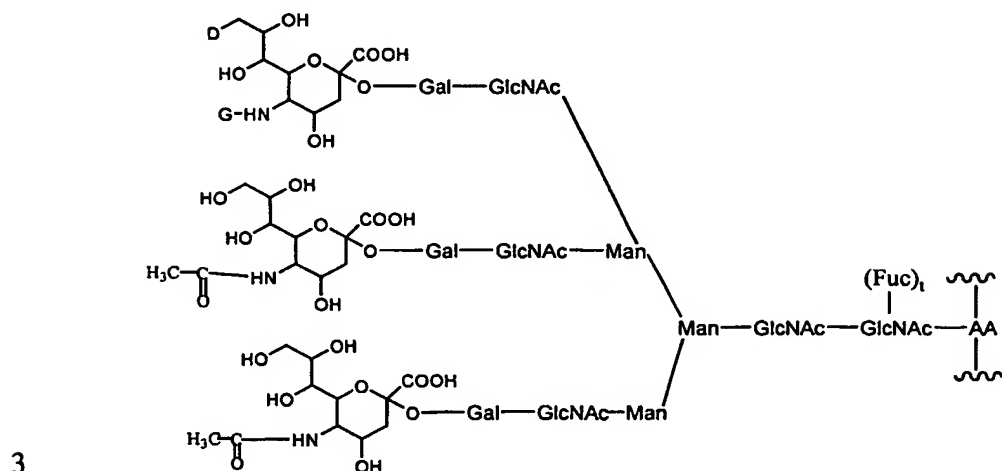


4 wherein AA is an amino acid residue of said peptide, and t is an integer equal to 0 or
5 1.

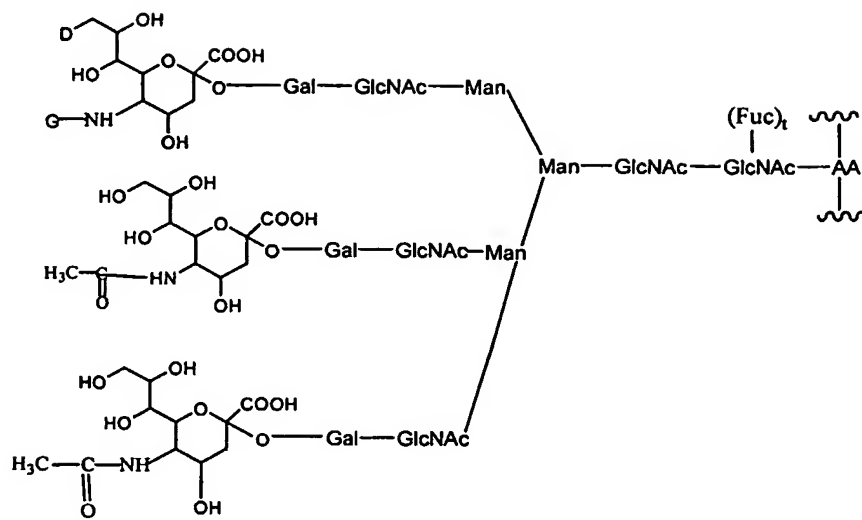
1 **17.** The peptide according to claim 16, wherein said amino acid residue is an
2 **arginine residue.**

1 **18.** The peptide according to claim 17, wherein said peptide has the amino acid
2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine
3 residue which is a member selected from N24, N38, N83, and combinations thereof.

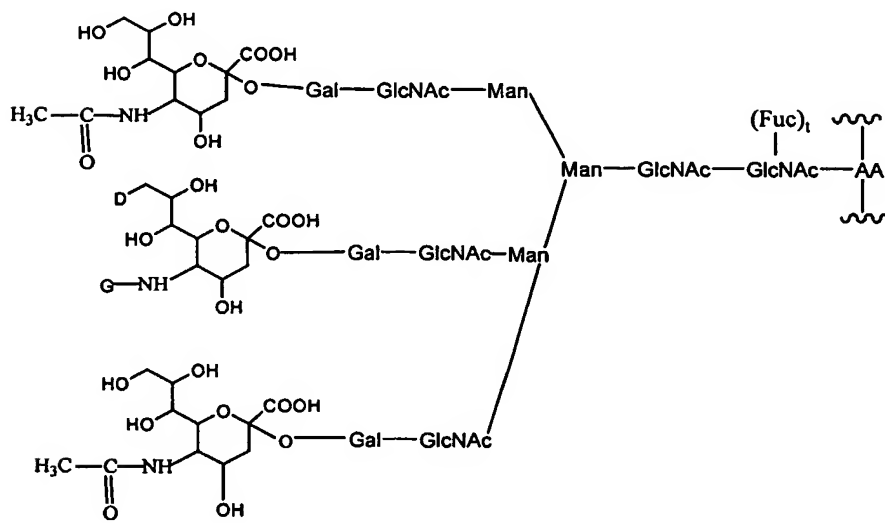
- 1 **19.** The peptide of claim 1, wherein said peptide comprises at least one of said
 2 moiety according to a formula selected from:



6

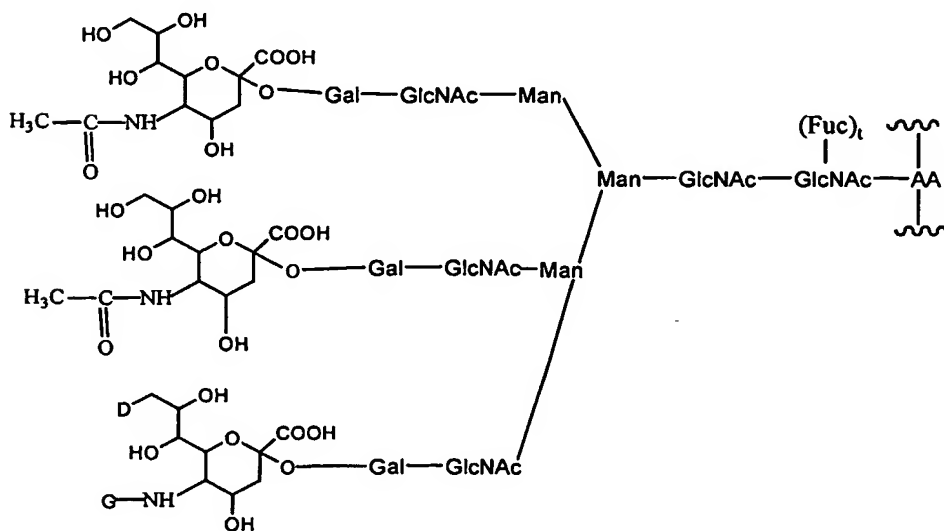


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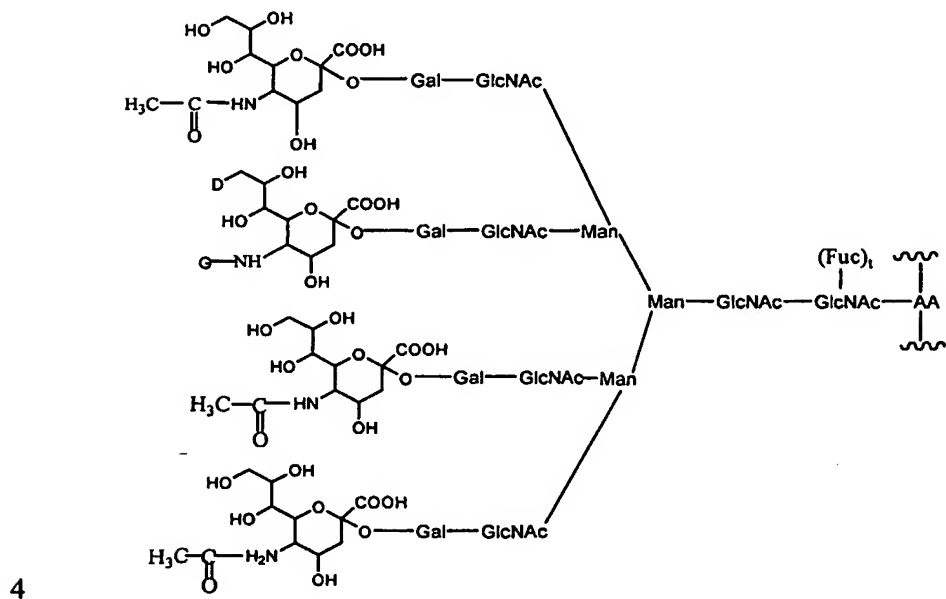
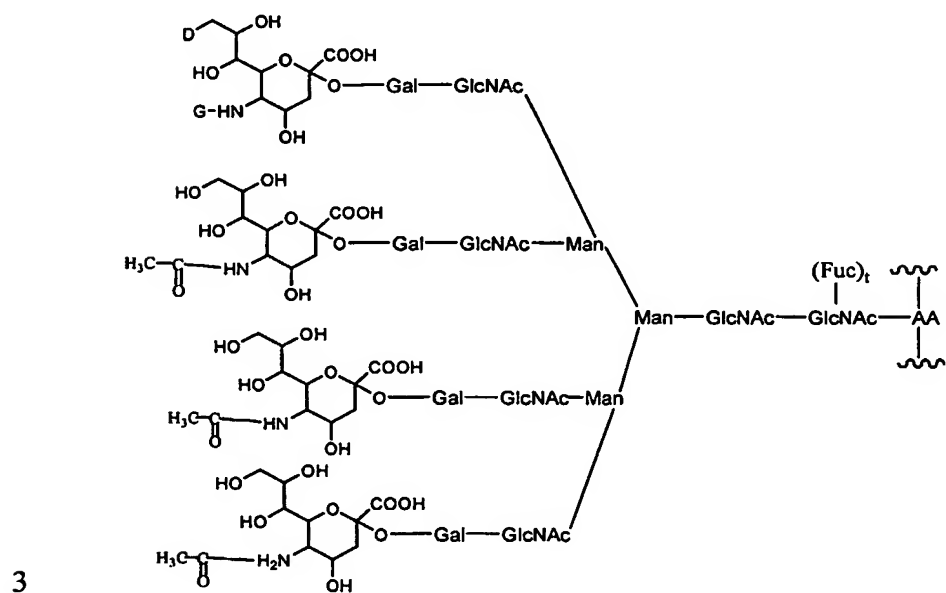
, and

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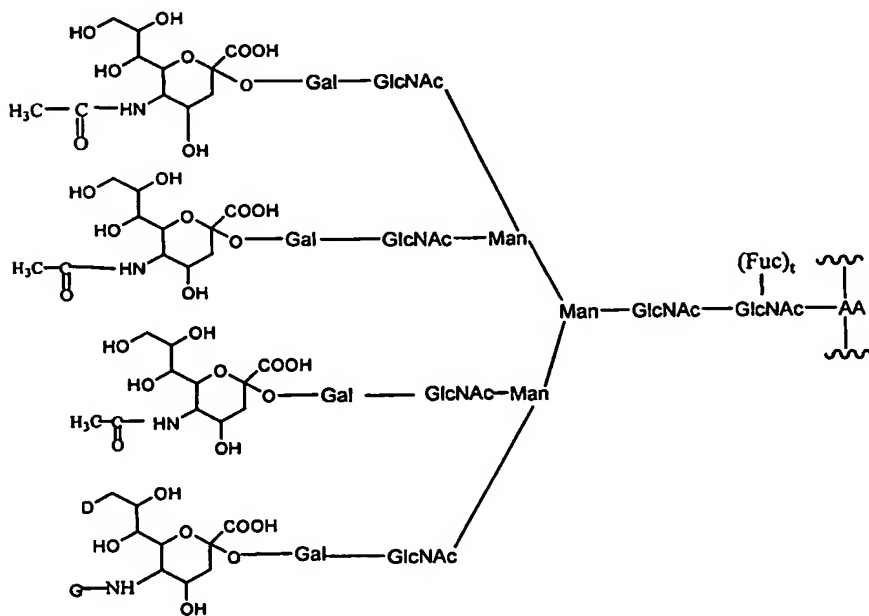
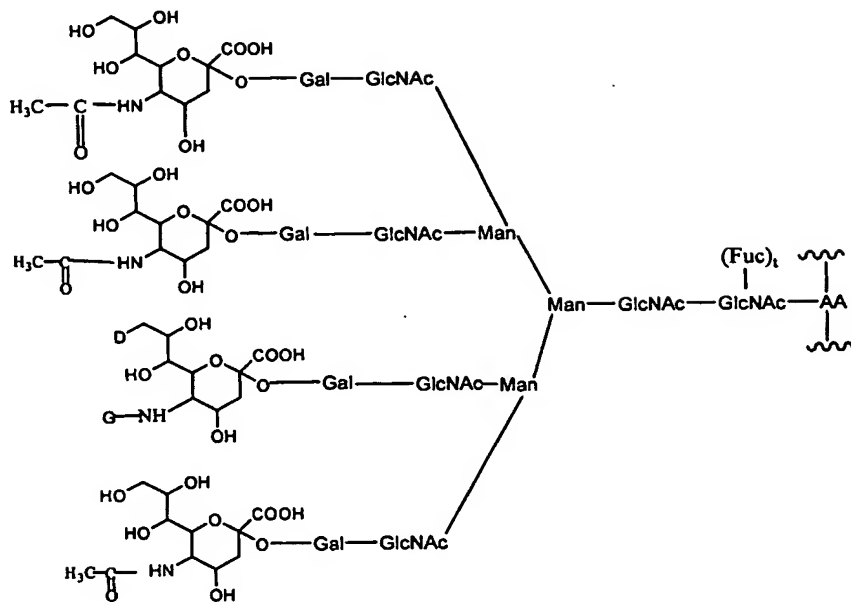


9 wherein AA is an amino acid residue of said peptide, and t is an integer equal to
10 0 or 1.

1 **20.** The peptide according to claim 1 wherein said peptide comprises at least one
2 said moiety according to a formula selected from:



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7 wherein AA is an amino acid residue of said peptide, and t is an integer equal to 0
8 or 1.

1 21. The peptide according to claim 20, wherein said amino acid residue is an
2 asparagine residue.

1 22. The peptide according to claim 21, wherein said peptide has the amino acid
 2 sequence of SEQ ID NO:1, and wherein said amino acid residue is an asparagine
 3 residue which is a member selected from N24, N38, N83, and combinations thereof.

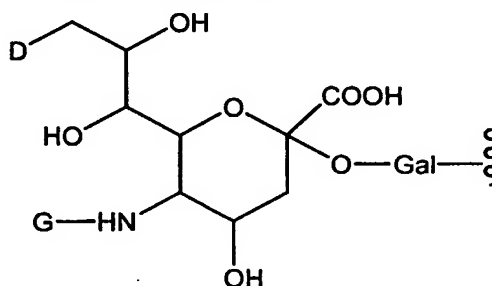
1 23. The peptide according to claim 1, wherein said peptide is a bioactive
 2 erythropoietin peptide.

1 24. The peptide according to claim 23, wherein said peptide is erythropoietically
 2 active.

1 25. The peptide according to claim 24, wherein said peptide is essentially non-
 2 erythropoietically active.

1 26. The peptide according to claim 25, wherein said peptide is tissue protective.

1 27. A method of making a PEG-ylated erythropoietin comprising the moiety:



2

3

wherein

4

R^1 is a moiety comprising straight-chain or branched poly(ethylene glycol)
 residue; and

5

6

L is a linker which is a member selected from substituted or unsubstituted
 alkyl and substituted or unsubstituted heteroalkyl,
 said method comprising:

8

9

(a) contacting a substrate erythropoietin peptide comprising the

10 glycosyl moiety:

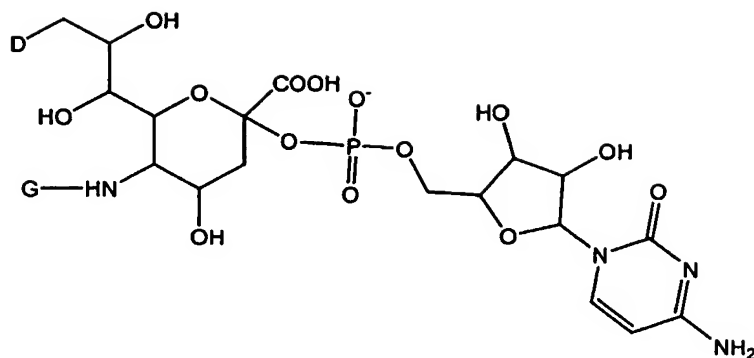


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12

13

with a PEG-sialic acid donor moiety having the formula:



14

15 and an enzyme that transfers said PEG-sialic acid onto the Gal of said glycosyl
 16 moiety, under conditions appropriate to for said transfer.

1 28. The method of claim 27, further comprising, prior to step (a):

2 (b) expressing said substrate erythropoietin peptide in a suitable host.

1 29. The method of claim 28, wherein said host is selected from an insect cell and a
 2 mammalian cell.

1 30. The method of claim 29, wherein said insect cell is a *Spodoptera frugiperda*
 2 cell line.

1 31. A method of treating a condition in a subject in need thereof, said condition
 2 characterized by compromised red blood cell production in said subject, said method
 3 comprising the step of administering to the subject an amount of a peptide according
 4 to claim 1, effective to ameliorate said condition in said subject.

1 32. A method of enhancing red blood cell production in a mammal, said method
 2 comprising administering to said mammal an peptide according to claim 1.

1 33. A method of treating a tissue injury in a subject in need thereof, said injury
 2 characterized by damage resulting from ischemia, trauma, inflammation or contact
 3 with toxic substances, said method comprising the step of administering to the subject
 4 an amount of an erythropoietin peptide according to claim 1, effective to ameliorate
 5 the damage associated with the tissue injury in said subject.

1 34. A pharmaceutical formulation comprising the erythropoietin peptide according
 2 to claim 1, and a pharmaceutically acceptable carrier.